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• **Maestri, Giovanni Eugenio**
43100 Parma (IT)
• **Schiaretti, Enrico**
43100 Parma (IT)

(71) Applicant: **BARILLA ALIMENTARE S.P.A.**
43100 Parma (IT)

(74) Representative: **Long, Giorgio et al**
Jacobacci & Perani
Via Senato, 8
20121 Milano (IT)

(72) Inventors:
• **Lauro, Antonio**
43023 Monticelli T. di Montechiarugolo (IT)

(54) **Method for obtaining biscuits and similar baked food products substantially in a plaited shape**

(57) A method is described by which at least one strand of a dough for shortbread and similar biscuits, continuously delivered from a moulding head (1), is continuously wrapped helicoidally around a first strand pref-

erably of another dough for shortbread biscuits, which is also continuously delivered from said moulding head (1) and kept in a rectilinear condition during said wrapping, with the obtaining of a shortbread biscuit substantially in a plaited shape.

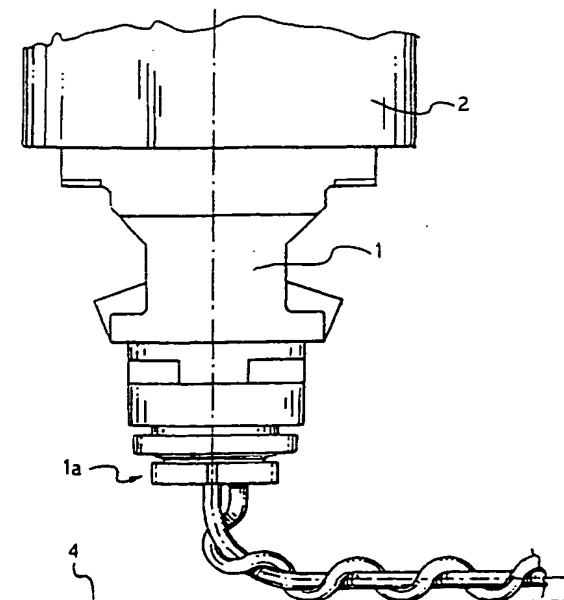


FIG. 4

Description

[0001] In its most general aspect the present invention relates to the production of biscuits and similar baked products in which a dichotomy of flavours and/or colours is clearly evident, obtained by the use of starting doughs of different types. Such doughs can in fact be of different structure and/or consistency, and each can include characterizing ingredients which give it different colours and/or flavours contrasting with those of the other doughs that contribute to the "composition" of the biscuit.

[0002] More particularly, the present invention relates to a method for obtaining shortbread biscuits substantially in a plaited shape.

[0003] The term "shortbread biscuits" means biscuits based on a dough of a short pastry or similar type.

[0004] It is known that the current technique for production of shortbread biscuits (to which a nonlimiting reference is made here), based on the use of at least two different starting doughs able to give them a desired and predetermined dichotomy of structure and/or flavour and/or colour, suffers from some disadvantages which cannot be ignored and which have not yet been overcome, such as:

- the batch nature of the production process, in particular of the operation of combining the two starting doughs, resulting in relatively limited productivity;
- the low versatility of the production system, it being difficult, if not impossible, to vary during operation the ratio in the finished product between the quantities of the two different doughs of which it is composed, relative to that set at the start of the same production process;
- the impossibility of varying the "dimensions" of the product in the course of the process, relative to those determined initially, unless the operation of the machines is stopped in order to change matrices, moulds or dies, moulding and/or extrusion heads.

[0005] A further disadvantage, inherent in the working of the short pastry of which the shortbread biscuits are essentially composed, derives from the fact that such pastry is difficult to knead, because of the plastic structure of the fat-rich dough, which causes it to "break" easily during working.

[0006] The technical problem which forms the basis of the present invention is that of making available a method for shaping shortbread biscuits and similar baked products which is able to overcome all the aforesaid disadvantages simultaneously, without for this reason being difficult to put into effect or requiring the use of complex and uneconomical equipment.

[0007] The problem is solved, according to the invention, by a method having the functional characteristics set out in the subsequent claims.

[0008] The invention also relates to equipment for shaping biscuits or similar baked products, which can be used to put the aforesaid method into effect. Such equipment has the characteristics set out in the claims which follow.

[0009] The advantages and characteristics of the present invention will be more clearly apparent from the following description of an example of the embodiment of a method according to the invention, with reference to equipment depicted in the appended drawings, which are given by way of illustration and not of limitation, and in which:

- Figure 1 schematically represents equipment according to the invention and
- Figure 2 represents the detail of the moulding head of the equipment in Figure 1, in section and on an enlarged scale,
- Figure 3 represents a section taken along the line III-III in Figure 2,
- Figure 4 represents, schematically and on an enlarged scale, a detail of the equipment in Figure 1, in an operational condition.

[0010] With reference to the aforesaid figures, equipment for obtaining biscuits or similar baked products, substantially in a plaited shape, essentially comprises at least a moulding head, globally indicated as 1, engaged and removably locked on a corresponding terminal 2 of an extrusion machine which is known per se and therefore not represented.

[0011] The equipment also comprises a belt conveyor 3, having an upper active branch 4 which is substantially horizontal, positioned beneath the dough feed outlet 1a and at a predetermined distance therefrom.

[0012] Said conveyor 3 is used to continuously supply a baking oven 5 with the product being processed (for example, uncooked shortbread biscuits), as specified in the remainder of the description.

[0013] Downstream of the moulding head 1a, with reference to the direction of travel A of the active branch 4 of the conveyor 3, and in a position above said conveyor, there is a vertical cutter 6, of an entirely conventional type, for example and preferably a cutter of the guillotine type, the cutting blade of which is indicated as 7. In line with the cutter 6, the equipment of this invention can include a closing machine 8 and an icing-glazing device 9, the functions and use of which will be apparent from the description which follows.

[0014] With reference to Figures 2 and 3, the moulding head 1 comprises a body 10 which contains in a single piece a first portion 11, substantially cylindrical, and a second portion 12, also cylindrical, coaxial with the preceding one and of smaller diameter. Between said portions there is a flat annular shoulder 13.

[0015] Said body 10 is crossed axially by a passage having a dough inlet end 10a and a dough outlet end 10b. Said axial passage is made up of a truncated-cone-

shaped part 14 and a cylindrical part 15; the truncated-cone-shaped part 14 extends in the portion 11 of greater diameter, while the cylindrical part 15 crosses the whole of portion 12 of said body 10.

[0016] A sleeve 16, retained radially by a bearing 17, which in turn is supported in an annular housing 18, secured by means of screws 19 to the body 10, level with the shoulder 13, is mounted on the cylindrical portion 12 of smaller diameter in such a way as to be able to revolve.

[0017] A power-driven gear 20 is fitted on said sleeve 16, with which it is integral in rotation, and is retained axially by an annular key 21, engaging at its circumference in the sleeve itself, in a predetermined axial position thereof.

[0018] In the cylindrical part 15 of said passage which crosses the body 10 axially, and level with the end thereof which is opposite to the truncated-cone-shaped part 14, a cylindrical die 22 is inserted which can revolve in close contact with the internal wall of said passage and which is integral in rotation with the sleeve 16, by means of a suitable ring 23 screwed onto the terminal part of the sleeve itself.

[0019] The die 22 is crossed axially by a hole 24 of predetermined diameter and by a second eccentric hole 25, parallel to the preceding one.

[0020] The lower cylindrical part 26 of a nozzle 27, positioned and retained axially in a fixed position in the passage 14-15, is inserted tightly into the axial hole 24, in the manner described below. Said cylindrical part 26, on which the die 23 engages in such a way as to be able to revolve, is provided externally with a helicoid groove 28, with an ascending helix, the known function of which is to carry upwards any material which may get between the nozzle and the die. A support 29, provided with a flange 30, by means of which the nozzle 27 is removably secured to the corresponding extrusion terminal 2, in fluid communication therewith, is mounted, for example by screwing, at the other end of said nozzle 27, which is positioned level with the mouth of part 14 of the axial passage of said body 10. The body 10 of the moulding head 1 is secured to another corresponding terminal, using conventional means which are not represented.

[0021] As can clearly be seen from Figure 2, between the body 10 and the nozzle 27 there is a dough reception chamber 31 which is open at the top to the corresponding extrusion terminal and "closed" at the bottom by the die 22.

[0022] Using the equipment described above, a method for putting into effect the method for shaping short-bread biscuits according to the present invention is now described. Said method involves the preliminary preparation of, for example, two different doughs, one of them being of a dark colour because of the addition of a predetermined quantity of cocoa powder, which is absent in the other dough. The base dough is obtained by a first-phase mixing of plasticized margarine (21%), refined sugar (20%) and dried skim milk (2%). In a subse-

quent phase leavening powders, shelled whole eggs (8.0%), glucose syrup (2.0%) and whole milk (7%) are added, still with mixing. Finally flour is added. As has been said, the second dough is obtained by addition of a suitable quantity of cocoa powder to the base dough. The doughs (light and dark) thus obtained are left to stand until a predetermined viscoelasticity is attained and are then fed into the hoppers of an extrusion machine. The arrangement of the extrusion terminals of said machine is such as to push one of the two doughs, for example the dark dough, through the central nozzle 27, while the other dough (in the example the light dough) is pushed through the chamber 31 between said nozzle 27 and the body 10 of the moulding head 1, described above, towards the eccentric outlet hole 25 of the die 22. In a particular example of embodiment of the present invention, the diameter of the outlet end of the nozzle 27 and that of the eccentric hole 25, as well as the extrusion pressures, were chosen in such a way as to obtain a dark dough/light dough ratio of 4:1.

[0023] From the nozzle 27 and from the eccentric hole 25, which in that example had been positioned at a distance of 100 mm from the conveyor 3-4 below, respective continuous strands of said doughs are emitted, which, on exiting from the feed head 1, are independent, substantially rectilinear and parallel. At the moment when the free ends of said strands touch the active branch 4 of the conveyor, remaining "anchored" to it (i.e. attached by friction), the die 22 is brought into rotation at a speed such as to cause the eccentric outlet hole 25 of the light strand to rotate around the nozzle 27 at a predetermined speed, which in the example was 210 rpm. The nozzle 27, however, is kept stationary, while the conveyor 3-4 is advanced at a predetermined speed (6 m/min in the specific example).

[0024] Under these conditions, in the part between the moulding head 1 and the active branch 4 of the conveyor, the light strand is continuously wrapped helicoidally over the dark strand, which maintains a rectilinear vertical position. In the example the pitch of the helicoid wrapping was about 21 mm. It should be noted that the aforesaid continuous wrapping of one strand over the other, by means of rotation of the die 22, is made possible by the fact that at the moment when the two strands, which are initially independent, touch the conveyor 3-4 with their free ends, they anchor themselves thereon, becoming integral with each other at that moment and at that point. It is only after they have become integral in this way that the rotation of the die 22 causes the desired helicoid wrapping.

[0025] Obviously the wrapping pitch can be varied by varying the speed of rotation of the die and/or the speed of extrusion of the doughs. Moreover, by using dies with two or more eccentric holes it is possible to obtain helicoid wrappings with two or more threads. It is also possible to vary the "shape" of the wrapping strand by varying the geometric shape of the eccentric holes, for example square, rectangular, triangular, polygonal and the

like.

[0026] Moreover, with regard to the rectilinear axial strand, it can be obtained by co-extrusion of two or more "doughs" having different organoleptic characteristics.

[0027] The semi-finished product, formed substantially in a continuous plaited shape and continuously deposited on the conveyor 3-4, is sent to a vertical cutter 6, which provides in a known manner for the obtaining and spacing inter se of plaited strips of predetermined length, indicated with P in Figure 1.

[0028] The strips P of semi-finished product (uncooked shortbread biscuits, for example) are then continuously fed to the oven 5, whence they are discharged after a period of about 12 min. The biscuits so obtained, plaited shortbreads, had a moisture content of 2.5% in the specific example.

[0029] According to a variant of the embodiment of the method of this invention, in the equipment described above there is a so-called closing machine 8, which gives an annular form (circular, for example, by means of a machine for forming ring-shaped biscuits) to the individual strips P coming from the cutter 6. Provision can also be made for an icing/glazing device 9, for a desired decoration or finish of the biscuits which one wants to obtain.

[0030] With regard to the doughs, it has been found that more than satisfactory results for obtaining shortbread biscuits were obtained when their compositions were within the following limits:

flour	45-55%
vegetable and/or animal fats	16-20%
whole and/or skim milk	0-5%
starch	0.5-3%
sugars and/or sugar syrups	15-22%
eggs	0.7%
cocoa	0-3%
emulsifiers	0-1%
dried milk	0-3%

[0031] The invention thus conceived leaves scope for variants and modifications, especially taking into account the fact that by changing the shapes of the extrusion apertures of the moulding head it is possible to obtain strands with irregular and fancy profiles, and also with different dimensions, thus varying the percentage amount of one dough relative to the others. It should also be pointed out that such variations can be easily effected in the course of operation, by replacing the die with another of the desired geometrical characteristics.

[0032] Other variants of the embodiment of the method described above, and for obtaining shortbread biscuits according to the present invention, can be achieved by taking into account that the final shape and pitch of the wrapping strand can vary as a function of certain variables, such as:

- the shape, dimensions and relative arrangement of the dough extrusion apertures (in particular the radial distance of the eccentric hole 25 from the central hole);
- the speed of extrusion of the dough;
- the speed of the belt conveyor 3;
- the distance of the moulding head 1 from the conveyor 3;
- the speed of rotation of the die 22.

[0033] It should be remembered that the description given above relates to the production of shortbread biscuits, whereas the method of the present invention can also be used to obtain other biscuits. Consequently, the data relating to the compositions of the doughs, as well as the descriptive data concerning the number, arrangement and shape of the outlet apertures of the moulding head, are not to be understood as limiting the invention.

[0034] On the basis of the above, many other variants can be applied to the present invention without going outside the sphere of protection thereof, which is defined by the following claims.

Claims

1. Method for obtaining biscuits and similar baked products substantially in a plaited shape, which present an organoleptic and/or structural dichotomy, comprising the following operational phases:

- making available equipment for the formation of biscuits with two components, which has a first and a second delivery nozzle (25, 27) and a belt conveyor (3-4) located below said nozzles;
- preparing at least two doughs for biscuits or similar baked products, having a predetermined viscoelasticity;
- continuously extruding said doughs from the respective said delivery nozzles (25, 27), with the obtaining of respective strands of dough which are independent and substantially rectilinear and have respective free ends, directed vertically towards and above said conveyor (3-4) in motion,

said method being characterized by the fact that it comprises the following operational phases:

- joining the free ends of said strands to each other by anchoring them on said conveyor (3-4), and
- continuously wrapping at least one strand of dough helicoidally around a predetermined strand of dough maintained in a substantially rectilinear condition, by means of the rotation of said first delivery nozzle (25) around said

second delivery nozzle (27), which is kept stationary, with the obtaining of a semi-finished product substantially in a continuously plaited shape.

2. Method according to Claim 1, further comprising the following operational phases:

- subjecting said semi-finished product in a continuously plaited shape to an operation of cutting and dividing into strips (P) of predetermined length, and 10
- baking said strips (P) of semi-finished product, with the obtaining of biscuits or similar baked products substantially in a plaited shape. 15

3. Method according to Claim 1 or 2, wherein said strands of dough are delivered at a predetermined distance above said belt conveyor (3-4). 20

4. Method according to any of Claims 1 to 3, wherein at least one of said doughs is based on short pastry.

5. Method according to any of Claims 1 to 4, wherein said strand of dough, kept rectilinear during the heli- 25
coid wrapping phase, is obtained by co-extrusion of at least two organoleptically different doughs.

6. Method according to any of Claims 3 to 5, wherein the distance between said first and second delivery nozzle (25, 27) from said belt conveyor (3-4) is 100 mm. 30

7. Method according to any of Claims 1 to 6, wherein said belt conveyor (3-4) is advanced at a speed of 6 m/min. 35

8. Equipment for the continuous production of biscuits and similar baked products, presenting an organoleptic and/or structural dichotomy, comprising a moulding head (1), supported above a belt conveyor (3-4) and at a predetermined distance therefrom, a vertical cutter (6) and a baking oven (5), characterized by the fact that said moulding head (1) comprises a body (10) crossed by an axial passage 40
(14-15), said passage having a dough inlet end (10a) and a dough outlet end (10b), a fixed delivery nozzle (27), axially supported in said passage (14-15), wherein it defines a dough reception chamber (31), a circular die (22) having a central hole 45
(24) and at least one eccentric hole (25), said die simultaneously engaging tightly in said outlet end (10b) and on an end section of said nozzle (27), in such a way as to be able to revolve, with means (16, 20, 23) being provided for bringing said die (22) into 50
rotation, relative to said nozzle (27) and to said body (10) of the moulding head (1). 55

9. Shortbread biscuit or similar baked product, substantially in a plaited shape, having an organoleptic and/or structural dichotomy, which can be obtained by the method of Claims 1 to 6.

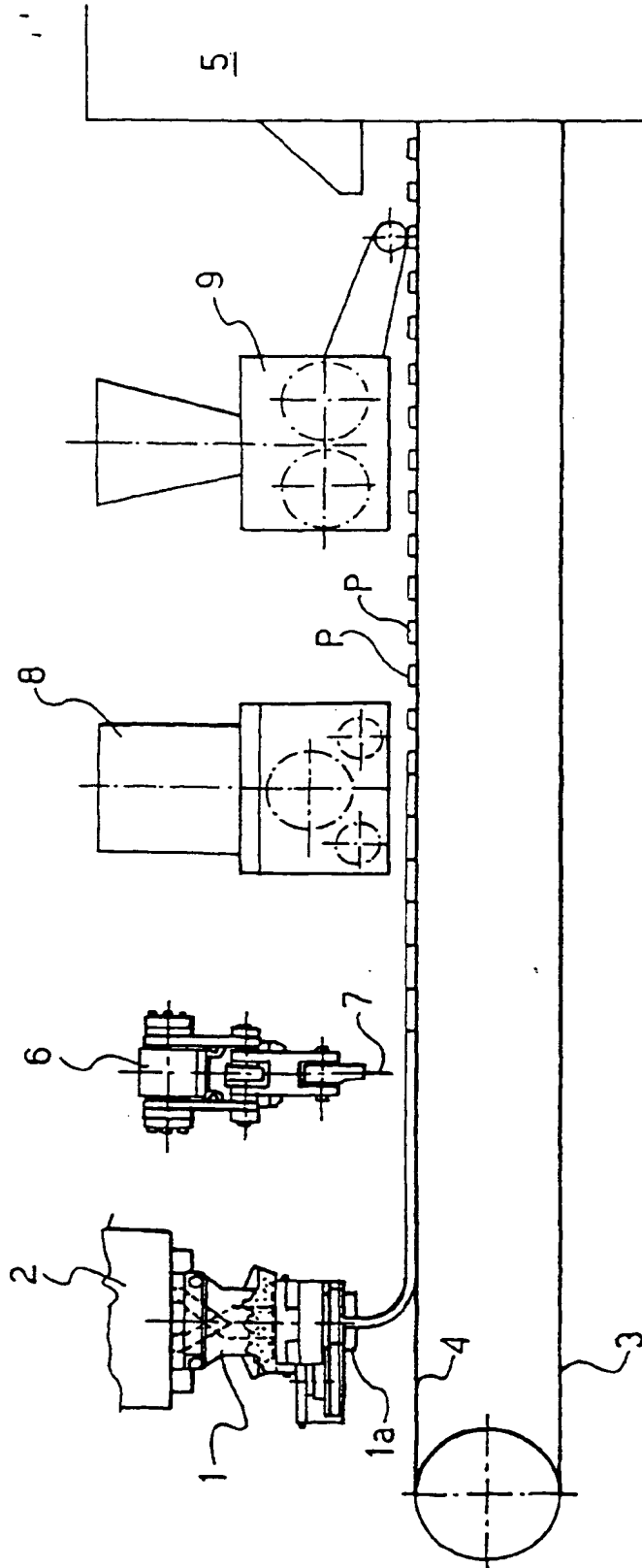
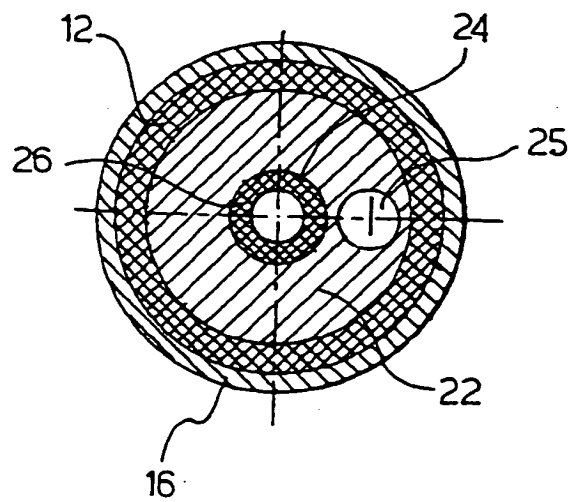
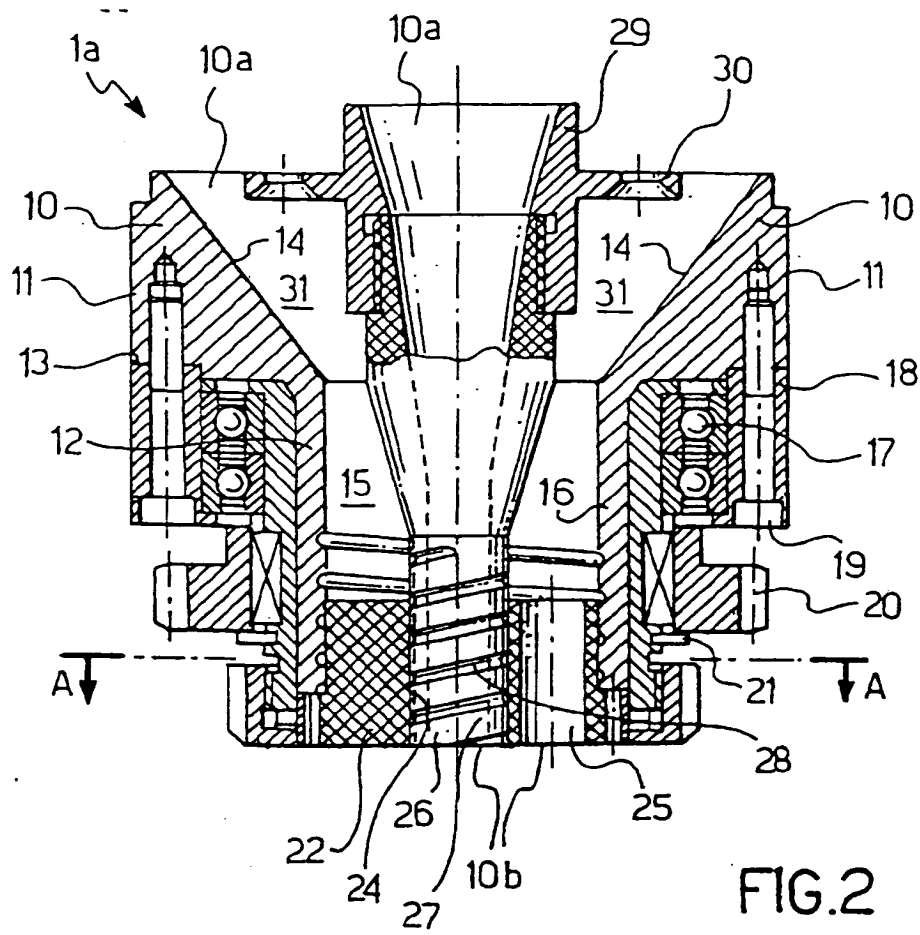


FIG.1



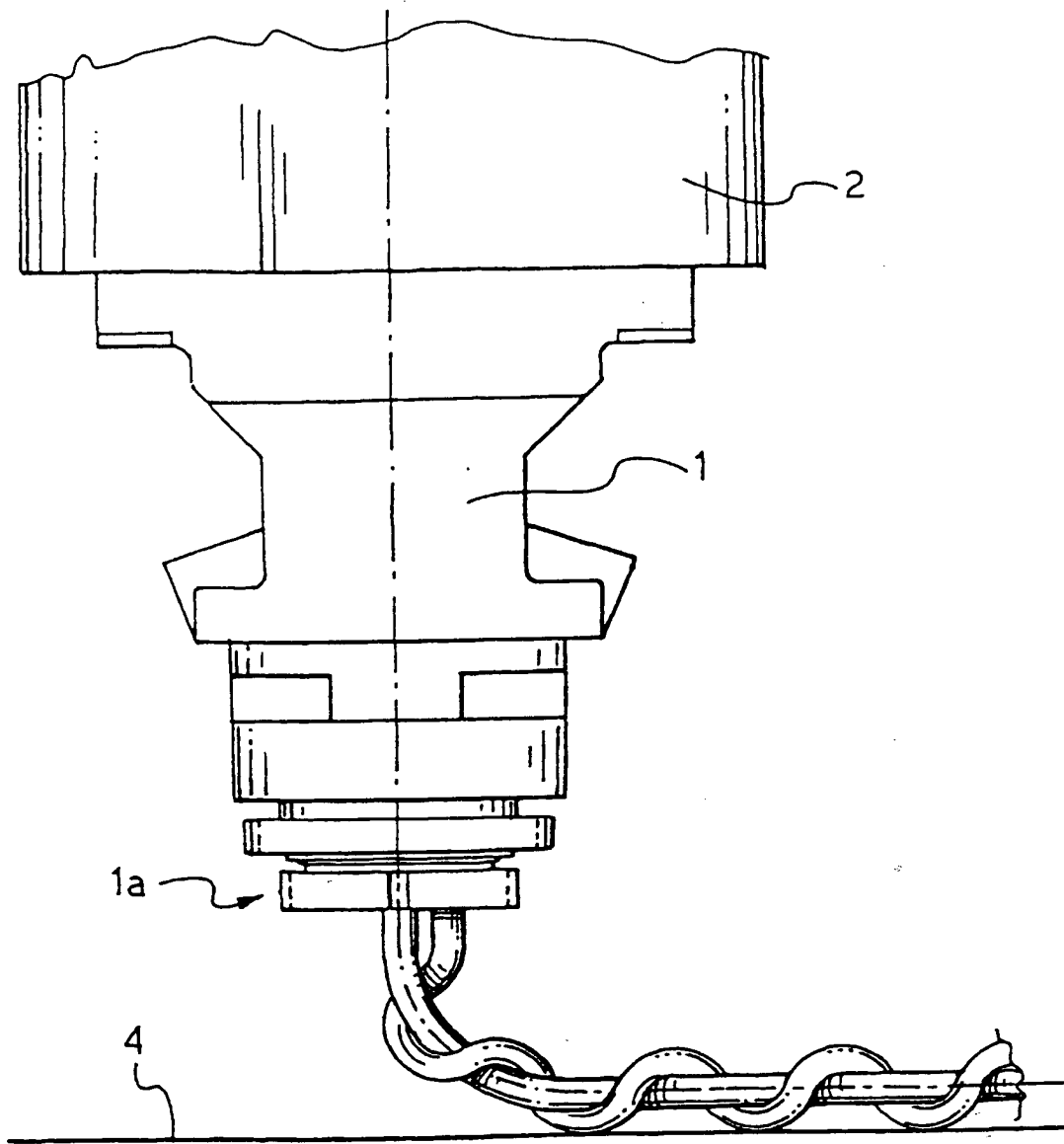


FIG.4



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